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Sonar In-Situ Mode Assessment System (SIMAS) AN/UYQ-25 Data Processing System Software Life Cycle Support Plan

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Surface Ship Sonar Systems Department

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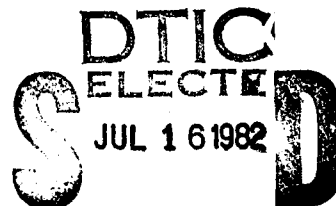
1 February 1980

NUSC

Naval Underwater Systems Center
Newport, Rhode Island • New London, Connecticut

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PREFACE

This LCM plan is a working document and was prepared assuming the SIMAS development was to have been completed in FY79 with the system entering into the maintenance mode in FY80. The manning and costs shown in Figures 8-3 and 8-4 project what is required to establish and support a stand-alone SIMAS software maintenance activity. The requirements outlined herein are based on the number and schedule for the production systems planned and actual maintenance requirements established for similar existing systems based on complexity, comparison of number of lines of code, and etc. As the required date for initiation of the activity moves further into FY80, a decrease in the FY80 costs still to be provided should be realized. It must be emphasized that SIMAS is the first system to enter into the maintenance mode, and as such, will bear the brunt of the cost to establish the activity. As the other systems (LAMPS, 53T) follow into the maintenance mode, although the total number of people and costs will increase for total LCM, it is expected that some sharing of tasks will result and hence, hopefully, a reduction in the share of the SIMAS contribution will be realized.

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

GLOSSARY OF ACRONYMS AND ABBREVIATIONS

APP	Acoustic Performance Predictions
CCF	Central Computer Facility
CM	Configuration Management
CMTU	Cartridge Magnetic Tape Unit
DPS	Data Processing Set
DTS	Data Terminal Set
ECP	Engineering Change Proposal
HAC	Hughes Aircraft Company
HEMA	Hardware Engineering Maintenance Activity
I/O	Input/Output
LBITS	Land Based Integrated Test Site
LCS	Life Cycle Support
LCSA	Life Cycle Support Activity
NAVSEA	Naval Sea Systems Command
NTDS	Naval Tactical Data System
NUSC/NL	Naval Underwater Systems Center/New London
QA	Quality Assurance
SCCB	Software Configuration Control Board
SCP	Software Change Proposal
SDF	Software Development Facility
SEMA	Software Engineering Maintenance Activity
SEP	Software Enhancement Proposal
SIMAS	Sonar In-Situ Mode Assessment System
SSS	Surface Ship Sonar
STR	Software Trouble Report

1.0   INTRODUCTION

1.1   Purpose

The purpose of this plan is to describe the structure of the maintenance activity necessary for life cycle support of the AN/UYQ-25 software system; define the scope of this effort; and delineate the requirements for satisfying this effort.

1.2   Objectives

The objectives of this plan are:

(1) to define the relationships between the Software Life Cycle Support Activity (LCSA) and other Navy organizations;

(2) to define the requirements to establish the Software Life Cycle Support Activity in all its facets;

3. to specify the items of software and hardware that must be maintained;

4. to describe the planned Software Life Cycle Support organization, including functional responsibilities and tasks; and

5. to project the life cycle cost in terms of personnel, funding, and equipment.

1.3   Scope

The scope of this AN/UYQ-25 Software Life Cycle Support Plan includes providing guidelines for establishing the LCSA and for defining functions, tasks, procedures and requirements for support of the software system during its life cycle.

1.4   Life Cycle Support Plan Updating

This plan will be updated as required to remain a viable basis for continued support of the AN/UYQ-25 software system.

2.0   ORGANIZATIONAL RELATIONSHIPS AND RESPONSIBILITIES

2.1   Structure Overview

Illustrated in Figure 2-1 are the relationships within the Life Cycle Support structure of the AN/UYQ-25 software system.

2.2   Organizational Relationships and Responsibilities

The ultimate responsibility for support of the AN/UYQ-25 software system lies with NAVSEA 63Y1, which has been designated the Project Manager. Technical support is the responsibility of NUSC/NL. Direction and funding for this support will be provided to NUSC/NL by NAVSEA 63Y1, to perform AN/UYQ-25 Software Life Cycle Support. Under the cognizance of NAVSEA 63Y1, AN/UYQ-25 Software Life Cycle Support will be provided by NUSC/NL.

AN/UYQ-25
LCSA
MANAGER

CONFIGURATION MANAGEMENT ACTIVITY
- VIA SUPPORT GROUP

QUALITY ASSURANCE ACTIVITY
- QA
- INTEGRATE
- TEST

SOFTWARE ENGINEERING MAINTENANCE ACTIVITY (SEMA)
- ANALYZE STR'S
- IMPLEMENT MODS

HARDWARE ENGINEERING MAINTENANCE ACTIVITY (HEMA)
- MONITOR H/W CONFIGURATION

FLEET LIAISON ACTIVITY
- TROUBLESHOOT
- VALIDATE STR'S
- INSTALL & TRAIN

SUPPORT GROUPS
- FACILITIES
- CM
- SUPPORT SOFTWARE
- TECHNICAL SUPPORT

AN/UYQ-25 LCSA STRUCTURE

FIGURE 2-1

2.3   Organization of AN/UYQ-25 LCSA Within NUSC/NL

As Figure 2-1 depicts, the AN/UYQ-25 LCSA will include all necessary
functions, both for performance of the LCS task and for satisfaction of
requirements of MIL-STD-1679 with respect to Configuration Management
and software control. The LCSA Manager will chair the Software
Configuration Control Board (SCCB) for the AN/UYQ-25 system. Other
members will be two representatives from Technical Support and two from
the AN/UYQ-25 LCSA staff. The SCCB will evaluate all prospective changes
to AN/UYQ-25 modules on the basis of operational impact, technical design
impact, and resource requirements, in seeking the optimal solution to
each.

NAVSEA 63Y1 will be given the opportunity to review and approve any
modification or enhancement which significantly impacts schedule or
budget. NAVSEA 63Y1 will also review and approve revision packages
prior to release of a new system revision.

The AN/UYQ-25 LCSA will interface as necessary with the following
groups for support:

- Surface Ship Sonar facilities group; for use of Central Computer
   Facility (CCF) and Land Based Integrated Test Site (LBITS) in
   software maintenance, testing and certification.

- Configuration Management group, for use of control, item tracking
   and library services.

- Support Software group for assistance in problems related to items
   of support software; refer to definitions in Section 4.

- NUSC Technical Support groups

   1. Code 331 for assistance with problems related to software
       performance.

   2. Code 335 for assistance with problems related to scientific
       functions of the system.

   3. Code 331 for assistance with problems related to system
       engineering and the interface impact among various systems
       (e.g., how changes in AN/UYQ-25 affect AN/SQS-53I).

3.0   AN/UYQ-25 HARDWARE TO BE MAINTAINED

3.1   Hardware Maintenance Policy

The AN/UYQ-25 system configuration will be installed at NUSC/NL in
LBITS as the nucleus of a test bed and alternate Tape Generation
Facility. It will be serviced by LBITS technical personnel, under
funding from the AN/UYQ-25 program.

The AN/UYQ-25 LCSA will monitor the hardware configuration for its
effect on the software system. NAVSEA 63Y1, as a member of the
Configuration Control Boards for the hardware configuration items,
will participate in decisions regarding ECP's and any associated
retrofits. Any retrofits necessary will be routed through NUSC and
may be held up until any software modifications necessary can be made.

```
                          ┌─────────┐
                          │  9TR    │
                          │  MAG    │
                          │  TAPES  │
                          └─────────┘

            ┌──────────┐                  ┌───────────┐
            │  CARD    │                  │   U200    │
       ↑    │  READER  │                  │  DISPLAY  │
            └──────────┘                  │  CONSOLE  │
  TEST BED/                               └───────────┘
  TAPE GENERATION
  COMPONENTS
 ─ ─ ─ ─ ─ ─ ─ ─ ─ ┌─────────────┐─ ─ ─ ─ ─ ─ ─ ─ ─ ─
                   │  AN/UYK-20   │
           Ø2      │     DPS      │      Ø6
  AN/UYQ-25        └─────────────┘
  SYSTEM             Ø14     Ø1               ┌────────────┐
      ↓                                       │ AN/USQ-69  │
                                              │  DISPLAY   │
                                              │  CONSOLE   │
         ┌──────────────┐    ┌─────────┐      └────────────┘
         │    TT624     │    │  AN/    │
         │  TELEPRINTER │    │ USH-26  │
         └──────────────┘    │  CMTU   │
                             └─────────┘
```

(NOTE: Four drives
        only three used by
        operational program)

INTERCOMPUTER
CHANNEL
RESERVED FOR
AN/SQS-53I
SYSTEM
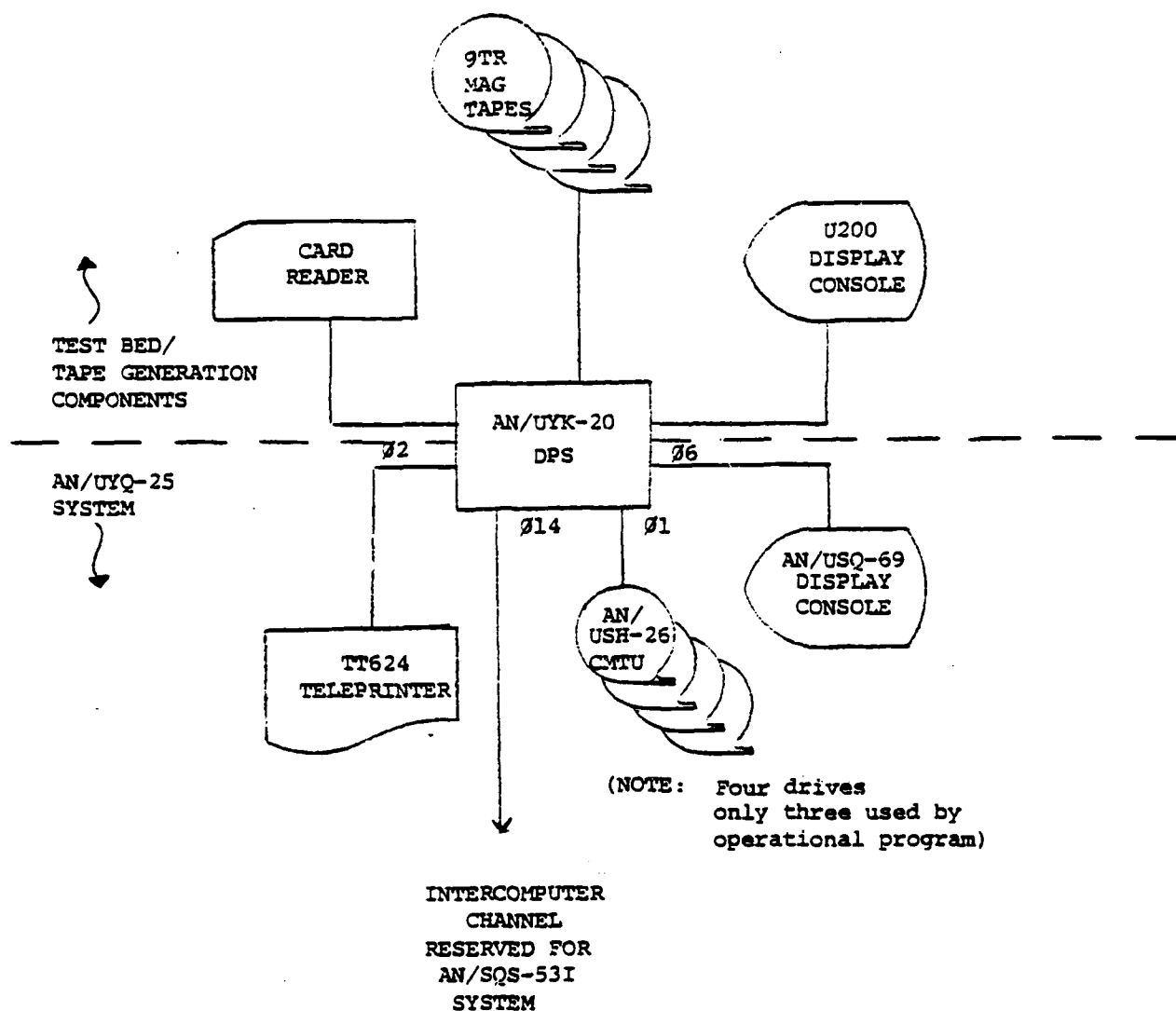
AN/UYQ-25 SYSTEM CONFIGURATION

FIGURE 3-1

-4-

3.1   (Cont'd)

Since further buys of the hardware will have any retrofits already
installed, prior routing of retrofits through NUSC will enable the
LCSA to keep ahead of the modifications in new buys.

3.2   Configuration

The total hardware configuration for the AN/UYQ-25 system including
test bed and tape generation components, is shown in Figure 3-1.

3.2.1   AN/UYK-20(V) Data Processing Set

The AN/UYQ-25 system uses one AN/UYK-20 standard Navy computer as its
Data Processing Set. The AN/UYK-20 is a general purpose militarized
16-bit digital computer.

3.2.2   AN/USH-26 Cartridge Magnetic Tape Unit

The vehicle for loading the AN/UYQ-25 system is the AN/USH-26 CMTU.

3.2.3   AN/USQ-69 Data Terminal Set

This peripheral to the AN/UYK-20, also a Navy standard, provides
operator control of the AN/UYQ-25 system, as well as of shipboard
diagnostic software.

3.2.4   TT624 Teleprinter

The Navy standard TT624 Teleprinter provides hard copy output of tables
and predictions generated by the AN/UYQ-25 system.

3.3   Interdependencies

While the AN/UYQ-25 system can be operated as stand-alone, it is
intended to interface with the AN/SQS-53I system. This interface is
via an intercomputer channel serviced by a special handler.

4.0   AN/UYQ-25 SOFTWARE TO BE MAINTAINED

The discussion of AN/UYQ-25 Data Processing System, Sonar In-Situ Mode
Assessment System (SIMAS), software program design and operation contained
in this itemization of software is intended to provide insight to the less
than intensive user and to form the basis for defining configuration items
to be placed under Configuration Management.

4.1   AN/UYQ-25 Software Maintenance Policy

4.1.1   Policy

All AN/UYQ-25 operational, diagnostic, and support software will be supported for the life cycle of the AN/UYQ-25 system by NUSC/NL in accordance with this Detailed AN/UYQ-25 Software Life Cycle Support Plan.

NUSC/NL is directly responsible for all items of software except those so noted. Items of software which are not the direct responsibility of NUSC/NL will still be configuration items, and their performance will be monitored during use and problems processed through channels already provided for them.

4.1.2   Definitions

This policy is based on the following defintiion, as they are expressed in MIL-STD-1679.

4.1.2.1 Operational Software

Operational software are those computer programs provided to a unit of the operating forces which contribute to the performance of the unit's mission. They include executive, peripheral drivers, functional modules, and loaders.

4.1.2.2 Support Software

Support software are those programs used in development, testing, and support of operational software. They include compilers, linkage editors, system generators, and debugging programs.

4.2   AN/UYQ-25 Software Items

4.2.1   Operational Software

1. Nucleus (SN) - the controller routine of the SIMAS operational software.

2. Prompter (SE) - performs system operator interfaces via the DTS console to establish environmental conditions and control sequence.

3. SQS-26 Active (SQ) - schedules surface direct (SS), bottom bounce (SB), and convergence zone (SZ) predictions as appropriate.

4. Surface Duct Predictions (SS) - performs surface duct mode predictions for AN/SQS-26 Active Sonar.

5. Bottom Bounce Predictions (SB) - performs bottom bounce predictions for the AN/SQS-26 Active Sonar.

6. Convergence Zone Predictions (SZ) - performs convergence zone predictions for the AN/SQS-26 Active Sonar.

7. Propagation Loss (SX) - computes propagation loss versus range to a target at a specified depth.

8. DIMUS Predictions (SM) - computes expected detection range for two integration times versus ship's speed for DIMUS system.

9. LAMPS Active Prediction (SL) - performs processing of signals from LAMPS Sonobuoys.

10. Passive Systems Predictions (SP) - performs processing to determine probability of detection of own ship.

11. Ray Trace (ST) - performs processing to plot ray traces, three rays to a beam, up to five beams.

12. Output Processor (SO) - produces all hard copy output to line printer and recommended values to the CMTU.

13. Changeable System Parameters (SC) - performs system operator interfaces via ADD console to update changeable system parameters.

14. Initialization (SI) - registers SIMAS tasks with the Executive; obtains CMTU drive assignments; updates function key list.

15. Abort (SA) - permits orderly shutdown of SIMAS software when requested via selection of function key on ADD.

16. Errors (SR) - provides all processing for system error.

17. AMOS (SW) - determines propagation loss in surface isothermal layer by use of AMOS equations.

18. 53 Interface (SV) - sends recommended values to the AN/SQS-53I upon request or when updated; this module will be integrated June 1980.

19. Prompter Data Base (GSANYCHG)

20. Configuration Control Data Base (GSCCTDBS)

21. Changeable System Parameters Data Base (GSCSPDBS)

22. Environmental Data Base (GSENVDBS)

23. Prediction Control Data Base (GSPCTDBS)

24. Sound Speed Data Base (GSSSPDBS)

25. Intrinsic Functions Data Base (GSIFSDBS)

26. SIMAS Executive (LBIT) - SIMAS version of SNDEX, the AN/SQS-53I
     executive.

27. Initialization (SDINF) - performs initialization of executive
     data base; sets computer to initial processing state; links I/O
     handlers to proper channels.

28. Time-Out Processor (SDMO) - at 100 ms intervals, determines
     whether I/O requests have timed out and takes appropriate action.

29. ADD Interface Service (IAIS) - performs I/O for AN/USQ-69.

30. Line Printer Interface Service (IPRTI) - performs I/O for TT624.

31. CMTU Interface Service (ICIS) - performs I/O for AN/USH-26.

32. Overlay Processor (SNOVL) - performs all overlay handling functions.

33. Intercomputer Interface Service (I   ) - performs all
     intercomputer message functions; this module will be integrated
     in June 1980.

34. CMTU-to-Core Loader (SLCC) - once bootstrapped, this loads the
     core-resident SIMAS code and then transfers control to a
     predesignated point.

35. Intrinsic Function Package (ZIFP) - provides mathematical functions
     to user.

4.2.2   Support Software

1. Debug (DBUG, DBUGS) - provides interactive program control for
    purposes of testing and debugging.

2. SSP Maintenance Program (SSP Maint) - provides vehicle for updating
    sound speed profile tape which is part of the AN/UYQ-25 software
    system.

3. Level 2 - operating system, used in SDF, hosted on AN/UYK-20,
    under which the AN/UYQ-25 system was developed. NAVELEX 570 is
    the official maintenance activity. UNIVAC handles all related
    problems under NAVELEX direction. The AN/UYQ-25 LCSA will interface
    with NUSC personnel who are responsible for NAVELEX interface.

4. MTASS - Machine Transferrable AN/UYK-20, AN/AYK-14 Support Software
    which runs on host mainframe; installed at NUSC on 1108 facility
    which is accessed from SDF by modem, and on VAX 11/780 in Code 40.
    When the Code 33 VAX is installed, AN/UYQ-25 will utilize MTASS
    for all software maintenance. MTASS responsibility is of the same
    structure as (2) Level 2.

5. CMS-2M Navy standard high level language, in which AN/UYQ-25 software is written. Responsibilities are of same structure as (3) Level 2.

6. Diagnostics listed here are under NAVELEX 570's direction.

    - AN/UYK-20

    - AN/USH-26

    - AN/USQ-69

    There is no software diagnostic for the TT624 teleprinter which utilizes a diagnostic card (hardware) instead.

7. CMS Preprocessor (CMSPR) - processes CMS-generated object modules to be used in system generation, resolving forward references and masked presets. This program is used in conjunction with SSSMPGEN and is to be used on an interim basis until implementation of the POST PROCESSOR with the MTASS System Generator.

8. System Generator (SSSMPGEN) - produces a bootable system tape from (1) a library of modules which have been processed through CMSPR, and in conjunction with (2) a deck of cards specifying load instructions.

9. Master/Copy Validation (MATCHEM) - compares master tape to copy, block by block, and indicates failures to match.

10. Cartridge Certification (CARTCERT) - validates cartridges for tape errors.

11. Output Selections (SOFIXDF) - data file of print buffers used in hard copy output of AN/UYQ-25.

12. Post Processor (   ) - converts output of MTASS system generator to format of input to loaders; written in Fortran. These two programs will replace CMSPR and SSSMPGEN when delivered by Hughes Aircraft Company.

4.3   <u>Software Configuration and Core Requirements</u>

Figure 4-1 illustrates the software configuration of the AN/UYQ-25 system, showing the core resident elements, overlays, and the core requirements of all (given in decimal).

```
        ┌──────────┐                      ┌──────────┐
        │  CORE    │                      │ OVERLAY  │ 1
        │ RESIDENT │                      │          │ 2
        │          │                      │          │ 3
        └──────────┘                      └──────────┘
```

ELEMENT	SIZE (DEC)
SO	4,610
SX	8,534
SW	1,157
LBIT	5,912
IPRTI	377
IAIS	753
SDMO	805
ICIS	702
SNOVL	498
ZIFP	1,379
SN	1,261

OVERLAY AREA

SI	1,239	
SDINF	2,756	12,156
SC	8,161	

ELEMENT	SIZE (DEC)
SR	2,624
SA	795
GSANYCHG	404
GSCCTDBS	9
GSCSPDBS	181
GSENVDBS	307
GSIFSDBS	9
GSPCTDBS	75
GSSSPDBS	415

30,807 W/O OVERLAY AREA

+ 18,776 LARGEST OVERLAY

49,583 MAXIMUM IN CORE (75.7%)

#1
ELEMENT	SIZE (DEC)
SE	13,430
	13,430

#2
SQ	2,585
SS	3,607
SB	8,299
SZ	4,285
	18,776

#3
SM	1,887
SL	2,465
ST	2,545
SP	3,999
	10,896

SLCC LOADER 1,342

DBUG077 5,432

AN/UYQ-25 SOFTWARE CONFIGURATION
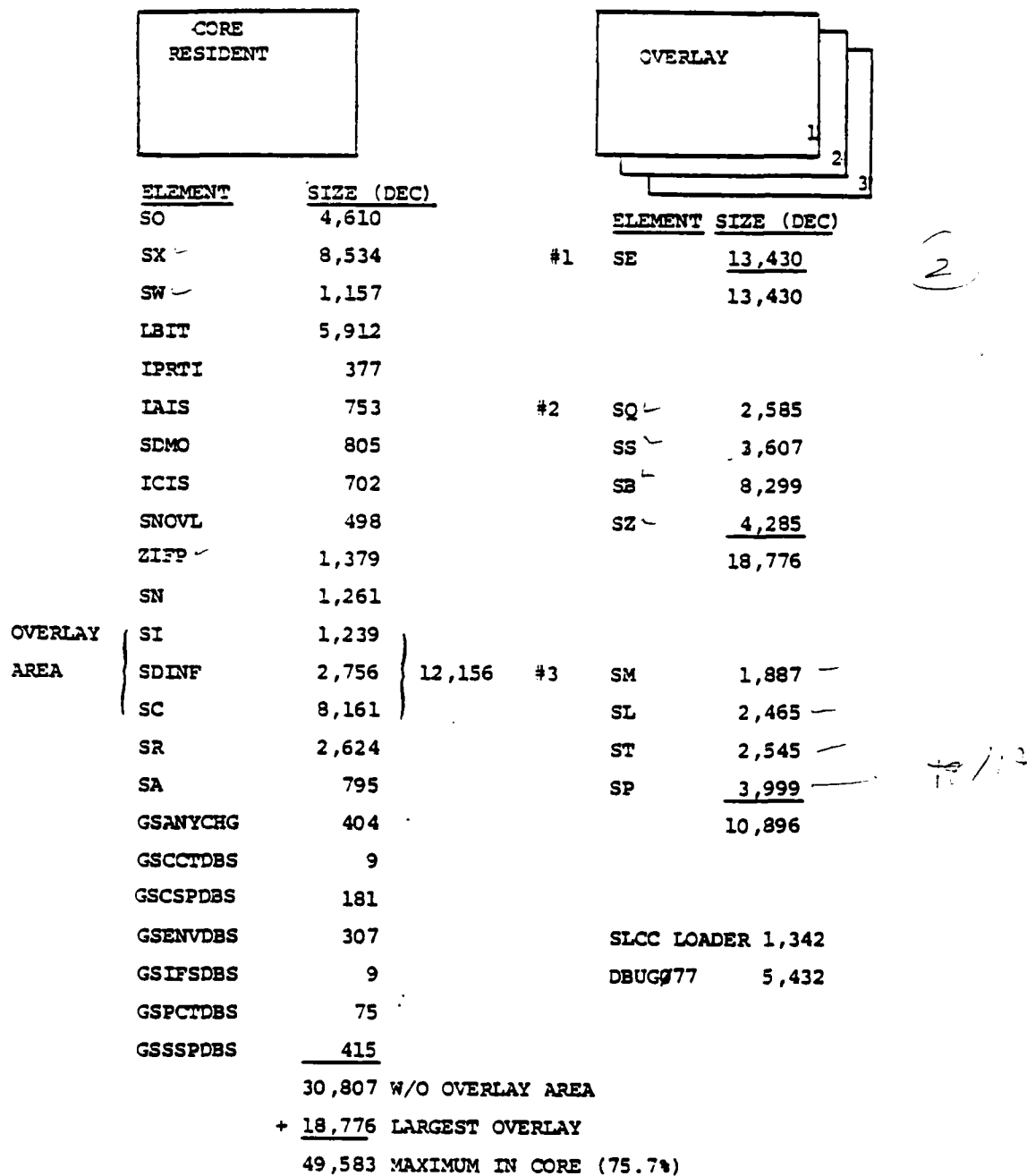AND CORE REQUIREMENTS

FIGURE 4-1

5.0   EQUIPMENT AND FACILITY REQUIREMENTS

5.1   Software Maintenance Requirements

5.1.1 Requirements for software maintenance for the AN/UYQ-25 system are:

1. Capability to store and edit large source files.

2. Capability to store large object files.

3. Capability to generate AN/UYK-20 object code via CMS-2M compiler or Macro assembler.

4. Capability to generate loadable (bootstrap or linking loader) system or library tapes.

5. Capability to simulate AN/UYK-20 code execution to facilitate testing and debug efforts.

6. Capability to validate blank cartridges for tape errors.

7. Capability to duplicate cartridge masters of system software for installation in the fleet.

5.1.2 Requirements 1 through 5 can be satisfied by the department's Central Computer Facility's (CCF) VAX 11/780 hosting MTASS; 6 and 7 by augmenting AN/UYQ-25 test bed and by augmenting the VAX.

5.2   System Certification and Testing Requirements

5.2.1 Requirements for system certification and testing are:

1. Capability to test fully integrated systems in a shipboard configuration with all components and interfaces in place.

2. Capability to test individual modules in a unit debug mode.

5.2.2 System Certification and Testing requirement 1 can be met by the AN/UYQ-25 test bed in LBITS, with the addition of a U200 display console and 9 track mag tape drives; 2 can be satisfied by the Central Computer Facility VAX with MTASS.

5.3   Configuration Management Requirements

5.3.1 Requirements of the AN/UYQ-25 system for Configuration Management are as follows:

1. Configuration Item Identification - The capability to collect and define, with the LCSA, all information which is to be controlled, thereby controlling the total identity and integrity of the computer program configuration item and its associated documentation.

2. <u>Configuration Baseline Identification</u> - The capability to establish an officially recognized configuration, with all associated specifications and technical documentation, as a control point.

3. <u>Configuration Change Control</u> - The capability to coordinate changes to an item that is under configuration control, including tracking status of all STR's.

4. <u>Configuration Accounting</u> - The capability to implement and maintain all activities necessary for keeping track of the current status of configuration items.

5.3.2 Configuration Management requirements can be satisfied by the existing Configuration Management organization in Code 331.

5.4 <u>Tape Generation Requirements</u>

5.4.1 Requirements of the AN/UYQ-25 system for generation of system tape pacakages are:

1. Capability to certify blank cartridges as error-free.

2. Capability to duplicate system tape packages for distribution.

3. Capability to validate copies as authentic.

4. Capability to generate system masters on an interim basis until the Hughes Aircraft Company postprocessor is in place on the VAX.

5.4.2 Requirements 1 through 4 can be satisfied by including 4 mag tape drives, a card reader, and a Level 2 system on the AN/UYQ-25 test bed; or by adding an AN/USH-26 with controller and driver to the Central Computer Facility, converting certification and validation software, and adopting the Hughes postprocessor.

6.0 AN/UYQ-25 LCMA ORGANIZATION

Reference Figure 2-1 for illustration of this organization.

6.1 <u>Organization Overview</u>

The Life Cycle Support Activity for the AN/UYQ-25 will perform the following functions:

- configuration control of operational software and documentation

- maintenance of operational software and documentation

- system certification and testing of software modifications

- review of hardware modifications as they affect the operational software and documentation

- quality assurance review of operational software and documentation

- fleet liaison

6.2   Detailed Functions and Responsibilities

6.2.1   LCSA Manager

           Responsibilities of the LCSA Manager are as follows:

           1. Chair the SCCB and monitor its activities to ensure prompt action.

           2. Direct and monitor the various activities within the LCSA.

           3. Perform administrative tasks, such as tasking and contracting
               external to the LCSA.

           4. Determine release schedule for updated system baselines and notify
               CM.

           5. Maintain budget accounting.

           6. Submit new versions of system modules to CM.

           7. Write and implement the AN/UYQ-25 Management Plan and Operating Plan.

           8. Implement the LCSA organization.

           9. Establish and maintain the interface with NAVSEA 63Y1 as a normal
               station in the review cycle on ECP's and system revision packages.

           10. Establish and maintain the interfaces with the agencies responsible
               for hardware configuration management, training and installation.

6.2.2   SCCB

           Responsibilities of the SCCB are as follows:

           1. Review SEMA recommendations for SCP's and SEP's, determine which
               should be implemented, and request an ECP be completed for each.

           2. Review SCP's, SEP's and associated ECP's and evaluate for system
               impact and feasibility, including performance, design and economic
               criteria. Forward all approved items to NAVSEA 63Y1 for their
               review.

           3. Ensure the integrity, viability, reliability, and maintainability
               of the software.

           The guidelines given in DOD-STD-480A for Engineering Changes, Class I
           and II, describe a change as Class I, generally, when cost, configuration
           identification, interface, and/or schedule impacts exist. Any other
           change is considered Class II.

           The objective of reclassification of STR's as SCP's or SEP's is to
           sort out Class I changes and ensure that they receive NAVSEA review,
           in view of their impacts, while minimizing the burden on NAVSEA by
           leaving STR's, as Class II changes, to the NUSC organization.

6.2.3   Software Engineering Maintenance Activity (SEMA)

Responsibilities for maintenance of all software and documentation belongs to SEMA.

1. Evaluate all STR's, assigning category and priority to each; recommending reassignment as SCP's or SEP's as appropriate.

2. Analyze all STR's, SCP's and SEP's, and design modifications to satisfy each.

3. Forward STR's/SCP's/SEP's with recommendations to Software Configuration Control Board for review and approval.

4. On return of STR's/SCP's/SEP's from SCCB, take appropriate action: implement necessary software modifications as approved, or redesign modifications if not approved, and perform unit tests.

5. Prepare ECP for each SCP or SEP approved by SCCB, providing cost and schedule impact data.

6. Submit modified modules to QA for integration and testing.

7. Correct any problems or errors found by QA.

8. Submit documentation modifications to QA.

6.2.4   HEMA

Responsibilities of the HEMA activity are as follows:

1. Monitor hardware configuration changes, including all retrofits (ECP's) for their effect on the software, to ensure continued system operability aboard all installations.

2. Monitor STR's/SCP's/SEP's for hardware considerations; if a hardware problem evidences itself, follow up as necessary with NAVSEA.

3. Review maintenance of AN/UYQ-25 test bed in LBITS to ensure conformance to current baseline/version configuration.

4. Test any configuration modifications made to ensure continuity in AN/UYQ-25 test bed capability.

6.2.5   Quality Assurance

Detailed responsibilities of the Quality Assurance activity are as follows:

1. Ensure that all software modifications conform to established program standards and to design specifications.

2. Ensure that all documentation modifications conform to established program and accuracy standards.

-14-

6.2.5 (Cont'd)

    3. Integrate and test modifications to operational software, as received from SEMA, ensuring operability of system software, accuracy of modifications, and reliability of system performance.

    4. Certify that the modification being tested does, in fact, satisfy the STR/SCP/SEP in question.

    5. Return problems to SEMA for correction.

    6. Perform system wide severity testing and certification testing.

6.2.6   Fleet Liaison

    1. Serve as contact point for fleet personnel with questions or problems regarding system operation or performance.

    2. Validate all STR's to ensure reproducibility.

    3. Resolve problems and, with assistance from other LCSA personnel, provide workarounds when possible to fleet personnel; recommend submission of STR's as appropriate.

    4. In the event an STR or a problem is not reproducible in-house, travel as necessary to the ship for further investigation.

    5. Maintain log of all fleet contacts, questions and answers, problems and suggested workarounds for reference by LCSA personnel.

    6. Coordinate distribution and delivery of new system versions with NAVSEA.

    7. Provide on-board training as necessary during installations.

6.3   Conformance to MIL-STD-1679

The organization of the LCSA is intended to satisfy the requirements of MIL-STD-1679, with respect to Configuration Management and Life Cycle Support. In general terms, these requirements are as follows:

    1. Identify configuration items requiring control.

    2. Define and control change implementation processes.

    3. Track development and change status.

    4. Ensure documentation is changed to reflect current status of the software.

7.0   OPERATIONAL PROCEDURES OF AN/UYQ-25 LCSR.

7.1   Definitions

The following definitions, taken from MIL-STD-1679, are assumed in
this plan.

7.1.1   Software Change Proposal (SCP)

A Software Change Proposal (SCP) is a proposed change to the weapon
system software or its documentation which would alter the approved
baseline software or documentation which is under configuration control.
An SCP is intended to be equivalent to a Class I Engineering Change
(ref DOD-STD-480A).

7.1.2   Software Trouble Report (STR)

A Software Trouble Report (STR) is a report that the weapon system
software is not in conformance with the approved baseline documentation
which is under configuration control. An STR is equal to a Class II
Engineering Change (ref DOD-STD-480A).

7.1.3   Software Enhancement Proposal (SEP)

A Software Enhancement Proposal (SEP) is a proposed change to the
weapon system software or its documentation or its interfaces which
is not an STR or SCP and is functionally transparent to all portions
of the weapons system that are not directly addressed by the SEP.
An SEP is intended to be equivalent to a Class I Engineering Change
(ref DOD-STD-480A).

7.2   Software Trouble Report (STR)

The Software Trouble Report (STR) is a formal document generated by
system users to communicate to the maintenance activity the existence
of software-related malfunctions or inadequacies.

The information provided by the STR form and accompanying support
material constitute the primary data base for the SEMA.

Figure 7-1 is the AN/UYQ-25 STR form in use.

7.2.1   STR Categories

These categories, per MIL-STD-1679 definition, are to be used in
classifying AN/UYQ-25 STR's.

- Software Trouble (S)
- Documentation Trouble (D)
- Design Trouble (E)
- Logic Trouble (L)

7.2.2 STR Priorities

These priorities, per MIL-STD-1679 definition, are to be used in classifying AN/UYQ-25 STR's.

- Priority 1: prevents accomplishment of mission.

- Priority 2: adversely affects accomplishment of mission, with no work around.

- Priority 3: adversely affects accomplishment of mission, with work around.

- Priority 4: operator inconvenience.

- Priority 5: all other errors.

7.3 Software Change Proposal (SCP)

The Software Change Proposal (SCP) is a request, submitted via STR channels, to modify the system software, documentation, or operational procedures. This reclassification will be effected by the AN/UYQ-25 LCSA.

The SCP will be handled via the same procedures as STR's, using the same categories and priorities.

Figure 7-2 is the AN/UYQ-25 SCP form in use.

7.4 Software Enhancement Proposal (SEP)

The Software Enhancement Proposal (SEP) is a request, submitted via STR channels, to enhance the system software, documentation, or operational procedures. This reclassification will be affected by the AN/UYQ-25 LCSA.

The SEP will be handled via the same procedures as STR's, using the same categories and priorities.

Figure 7-2 is the AN/UYQ-25 SEP form in use.

7.5 Engineering Change Proposal (ECP)

In conformance with MIL-STD-1679, an Engineering Change Proposal (ECP) (DD1692) will be generated for and attached to each SCP or SEP which has cost, interface, or schedule impact.

Figure 7-3 is the form DD1692 in use.

7.6   Operational Runstream

Figure 7-4 illustrates the flow of activity for STR's/SCP's/SEP's from
submission to resolution.

7.6.1   Procedures Narrative

Following is a discussion of Figure 7-4 which illustrates the flow
of activity of the STR from its inception to resolution.

1. An STR is generated, either by fleet personnel or by a user
    within the LCSA.

2. The STR, when submitted to NUSC, is received in Configuration
    Management, where it is logged and routed to the AN/UYQ-25 LCSA.
    CM maintains status accounting on all STR's that enter the system.

3. The AN/UYQ-25 LCSA receives the STR; Fleet Liaison personnel
    validate each STR to ensure it is reproducible. Reference
    should be made to Fleet Liaison's trouble log for information
    relevant to the STR.

4. If the STR is not reproducible, Fleet Liaison will interface
    with the originator, and if no resolution can be made by
    telephone, it may be necessary to travel to the originator's
    location to resolve the problem. In any event, when the STR
    is determined to be invalid, it will be closed and the user
    notified.

5. SEMA will assign priority and category to each STR that has
    been validated.

6. If SEMA determines that the STR pertains not to a problem in
    conforming to existing design specification, but rather to a
    prospective change to design specifications, they recommend
    the STR be made an SCP.

    If the STR is judged to pertain to an enhancement to existing
    design specifications, SEMA recommends the STR be made an SEP.

7. SEMA analyzes the STR for possible causes, and proposes design
    changes/software modifications as appropriate.

8. The AN/UYQ-25 LCSA notifies CM of the status of each STR/SCP/SEP;
    CM maintains status accounting to that effect.

9. The SCCB reviews SEMA recommendations and requests an ECP for
    each SCP or SEP approved.

10. SEMA prepares an ECP for each SCP or SEP, and proposes design
    changes to implement each.

11. The SCCB reviews all SCP's and SEP's, with associated ECP's and
    design change proposals, and authorizes or disapproved their
    implementation. Proposals disapproved are returned to SEMA.
    Proposals authorized are subject to NAVSEA 63Y1 approval.

-18-

7.6.1　(Cont'd)

12. SEMA implements authorized modifications, and returns rejected ones through Fleet Liaison to CM to be closed and the originator notified.

13. Quality Assurance integrates and tests modifications and reviews documentation.

14. Any item rejected by Quality Assurance is returned to SEMA for rework. Items approved by QA are submitted by the AN/UYQ-25 SCCB to CM.

15. When the LCSA Manager determines a new system baseline to be appropriate, he forms a package of all changes and forwards to NAVSEA 63Y1.

16. NAVSEA 63Y1 reviews the revision package and returns with approval to the LCSA Manager.

17. CM generates new system tapes as necessary to satisfy existing fleet installations and/or the Navy supply system.

18. CM updates status accounting to reflect disposition of the STR's/SCP's/SEP's.

19. At this point the life of an active STR/SCP/SEP terminates.

8.0　COST AND PHASING OF PERSONNEL AND EQUIPMENT

8.1　Personnel

Phasing and costs of AN/UYQ-25 personnel are shown in Figure 8-3. The figure includes recommendation for the source of the personnel, NUSC or contractor.

Costs are extended at $55K per man, both for NUSC and Contractor personnel. This is based on a projection that contracts can be negotiated at this rate.

1. DATE	2. CATEGORY	3. PRIORITY (CIRCLED)	4. STR NUMBER	5. M. STR
	N D E L	1 2 3 4 5		

5. TITLE BRIEFLY DESCRIBE PROBLEM

6. COMPONENT DESIGNATION	7. DOCUMENT AFFECTED	8. UNIT SITE

9. TAPE CARTRIDGE I.D.	10. REFERENCE DOCUMENT	11. FUNCTION AFFECTED

12. RESPONSIBLE MODULE OR DETAILED IDENTIFICATION	13. TEST STEP

14. ORIGINATOR (NAME OF INDIVIDUAL ORIGINATED)	15. ACTIVITY CODE	16. TELEPHONE EXT.

17. RUN TIME	18. SIMULATION USED	19. LINKING WITH:

20. CONFIGURATION/TRANSIENTS IN MEMORY

21. PROBLEM DUPLICATED	YES	NO	N/A	22. DUMP DATA	23. SYSTEMS STATUS
DURING RUN					
AFTER RESTART					
AFTER RELOAD					

24. TROUBLE DESCRIPTION

25. STOP DATA (SEE PAGE 2)

26. CORRECTIVE ACTION

27. TESTING

28. STR STATUS

ORGANIZATION	STATUS	DATE	INIT	ORGANIZATION	STATUS	DATE	INIT	ORGANIZATION	STATUS	DATE	INIT

FIGURE 7-1   -20-

TAPE DRIVE ASSIGNMENTS	1	1	2	3	DATE DD MM YY	MIN. PROVINCE	WIND SPEED (KTS)	BOTTOM DEPTH (FATHOMS)
OVERLAY								

HISTORICAL			SOUND SPEED AREA	BT SELECTED (CIRCLE ONE) T P N	RAYTRACE SELECTED Y N
REC. VALUE					

SYSTEM SELECTED (CIRCLE ONE) 1 2 3 4 5 6	TARGET STRENGTH	BIOL. LEVEL (CIRCLE) L H	PROPLESS PLOT (CIR) Y N	TGT BROADBAND RAD NOISE LEVEL DB/ uPa

TARGET DEPTH (FEET)	ARRAY DEPTH (FT)	HARD COPY CSP DATA INCLUDED	HARDCOPY OUTPUT PREDICTIONS INCLUDED Y N

RAYTRACE DATA ENTRIES	DEP ANGLE	BEAMWIDTH	PASSIVE SYSTEMS FREQ. FOM. DATA	THREAT LINE	FREQUENCY	FOM
				1		
				2		
				3		
				4		
				5		

NEW BT DATA ENTRIES	DEPTH	TEMP	COMMENTS
☐ ENGLISH			
☐ METRIC			

AN/UYQ-25 MAINTENANCE PANEL DATA			BIT CONFIGURATION																OR	
	CHECK	BLOCK		15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
BOOT SW POS	1	2	P REG																
STOP SW 1	ON	OFF	STATUS REG 1																
STOP SW 2	ON	OFF	STATUS REG 2																
PROG RUN LIGHT	ON	OFF	GENERAL REG 0																
PROG STOP LIGHT	ON	OFF																	
PROG FAULT LIGHT	ON	OFF																	
POWER FAULT LIGHT	ON	OFF																	

RECOMMENDATIONS:

THIS PAGE UNCLASSIFIED WHEN BLANK.

FIGURE 7-1.   -21-   Page 2 of 2

SEP/SCP SYSTEM FORM
AND-NLSC 3522.19 (8-79) (EXPERIMENTAL)

1. SYSTEM PROJECT NAME:	2. DATE PREPARED:	3. CROSS OUT ONE: SCP NUMBER/ SEP NUMBER:

4. TITLE OF SCP/SEP:

5. ORIGINATOR:	6. COMPONENT AFFECTED:

7. DESCRIPTION OF PROBLEM/ NEED FOR SCP/SEP:

8. DESCRIPTION OF RECOMMENDED SCP/SEP:

9. ALTERNATIVE/ IMPACT IF NOT APPROVED:

10. BASELINE AFFECTED:	11. DOCUMENTATION/SPECIFICATIONS AFFECTED:

12. OTHER SYSTEMS CONFIGURATION ITEMS:

13. EFFECT OF SCP/SEP ON SYSTEM EMPLOYMENT, ILS, TRAINING, EFFECTIVENESS, ETC.:

14. NET EFFECT ON SYSTEM RESOURCES (E.G. PROCESSING, MEMORY/ DISKSPACE):

15. DEVELOPMENTAL REQUIREMENTS:

16. SCP/SEP EFFECTIVITY POINT:	17. DATE APPROVAL NEEDED BY:

18. THIS SCP MUST BE ACCOMPLISHED BEFORE/ WITH/ AFTER THE FOLLOWING ECP/SCP/SEP/STRISH:

19. SUPERSEDES OR REPLACES ECP/SCP/SEP/STR:

20. COST SCHEDULE OR INTERFACE IMPACT- NO: COST. SCHEDULE OR INTERFACE IMPACT-   YES:
                                                 SEE ATTACHED DD FORM 1692 ECP

21.	CONTRACTOR SCCS ACTION:		
APPROVE: ☐	DISAPPROVE: ☐	ECP ☐	DEFERRED UNTIL: ☐

AUTHORIZING SIGNATURE:	TITLE:	DATE:

22.	GOVERNMENT SCCS ACTION:	
NO ACTION REQUIRED:	APPROVE:	DISAPPROVE

RETURNED TO CONTRACTOR FOR

GOVERNMENT AGENCY TITLE:	SIGNATURE	DATE

REMARKS:

FIGURE 7-2   -22-

ENGINEERING CHANGE PROPOSAL, PAGE 1   DATE PREPARED   PROCURING ACTIVITY NO.
(SEE MIL-STD-480 FOR INSTRUCTIONS)

1. ORIGINATOR NAME AND ADDRESS								2. CLASS OF ECP	3. JUST. CODE	4. PRIORITY

5. ECP DESIGNATION

a. MODEL/TYPE	b. MFR. CODE	c. SYS. DESIG.	d. ECP NO.	e. TYPE	f. REV.	g. CORR.

6. BASELINE AFFECTED
☐ FUNC-TIONAL   ☐ ALLO-CATED   ☐ PRODUCT

7. OTHER SYS./CONFIG. ITEMS AFFECTED
☐ YES   ☐ NO

8. SPECIFICATIONS AFFECTED - TEST PLAN

	MFR CODE	SPEC./DOC. NO	SCN
a. SYSTEM			
b. ITEM			
c. TEST PLAN			

9. DRAWINGS AFFECTED

MFR CODE	NUMBER	REV.	NOR NO.

10. TITLE OF CHANGE	11. CONTRACT NO. & LINE ITEM

12. CONFIGURATION ITEM NOMENCLATURE	13. IN PRODUCTION ☐ YES ☐ NO

14. NAME OF PART OR LOWEST ASSEMBLY AFFECTED	15. PART NO. OR TYPE DESIGNATION

16. DESCRIPTION OF CHANGE

17. NEED FOR CHANGE

18. PRODUCTION EFFECTIVITY BY SERIAL NUMBER	19. EFFECT ON PRODUCTION DELIVERY SCHEDULE

20. RETROFIT

a. RECOMMENDED ITEM EFFECTIVITY	c. SHIP/VEHICLE CLASS AFFECTED
b. ESTIMATED KIT DELIVERY SCHEDULE	d. LOCATIONS OR SHIP/VEHICLE NUMBERS AFFECTED

21. ESTIMATED COSTS/SAVINGS UNDER CONTRACT	22. ESTIMATED NET TOTAL COSTS

23. SUBMITTING ACTIVITY AUTHORIZING SIGNATURE	TITLE

24. APPROVAL/DISAPPROVAL

a. CLASS I ☐ APPROVAL RECOMMENDED	b. CLASS II ☐ APPROVED ☐ DISAPPROVED	☐ CONCUR IN CLASSIFICATION OF CHANGE	☐ DO NOT CONCUR IN CLASSIFICATION OF CHANGE
c. GOVERNMENT ACTIVITY		SIGNATURE	DATE

DD FORM 1692   S/N 0102-LF-020-8000   ☆ U.S. Government Printing Office 1979-665-012/2014 3-1   D-26320

FIGURE 7-3   -23-
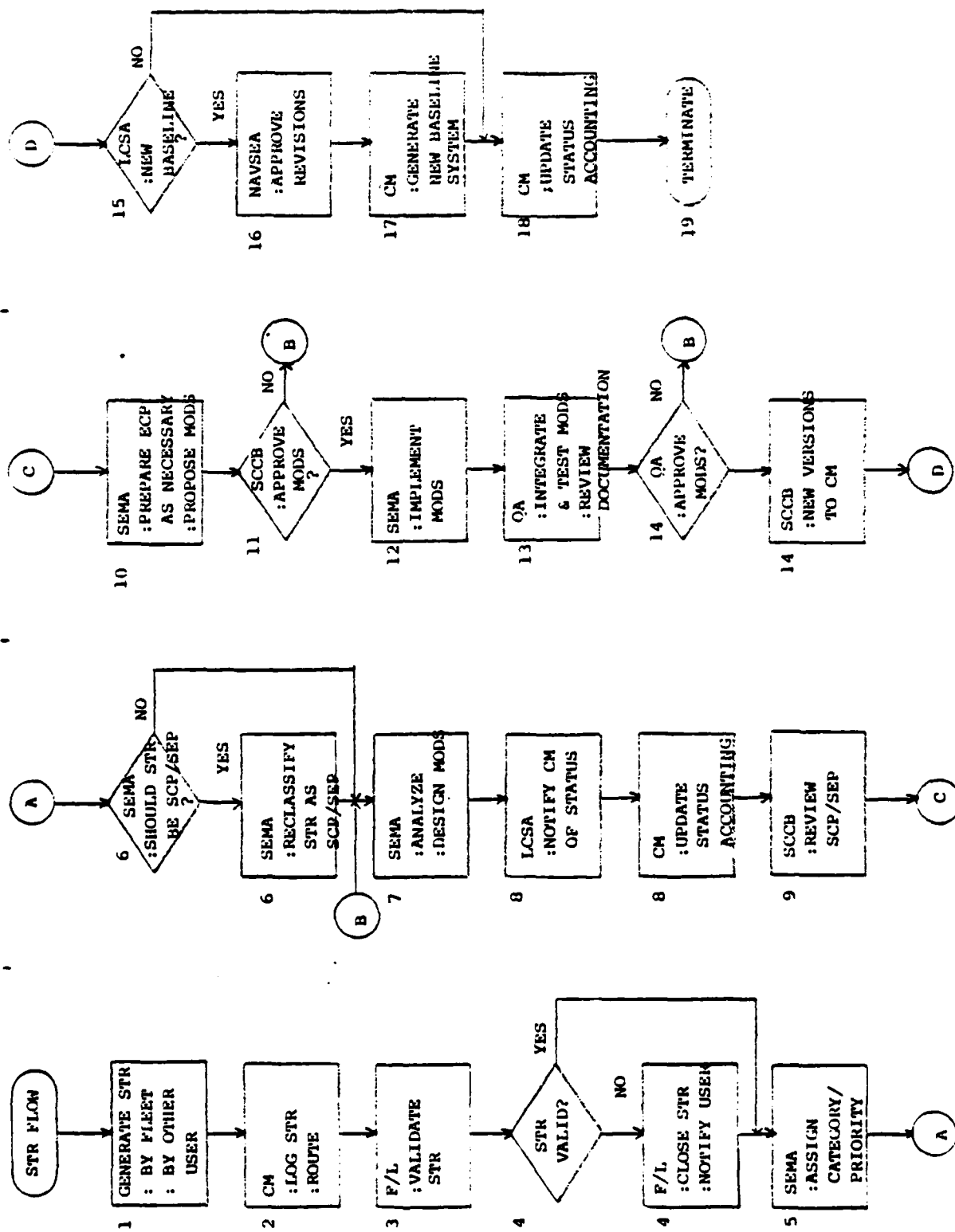
AN/UYQ-25 LCSA OPERATIONAL RUNSTREAM
FIGURE 7-4

STR FLOW

1. GENERATE STR : BY FLEET : BY OTHER USER
2. CM : LOG STR : ROUTE
3. F/L : VALIDATE STR
4. STR VALID? — YES / NO
4. F/L : CLOSE STR : NOTIFY USER
5. SEMA : ASSIGN CATEGORY/PRIORITY
→ A

A →
6. SEMA : SHOULD STR BE SCP/SEP? — NO / YES
6. SEMA : RECLASSIFY STR AS SCP/SEP
B
7. SEMA : ANALYZE : DESIGN MODS
8. LCSA : NOTIFY CM OF STATUS
8. CM : UPDATE STATUS ACCOUNTING
9. SCCB : REVIEW SCP/SEP
→ C

C →
10. SEMA : PREPARE ECP AS NECESSARY : PROPOSE MODS
11. SCCB : APPROVE MODS? — NO → B / YES
12. SEMA : IMPLEMENT MODS
13. QA : INTEGRATE & TEST MODS : REVIEW DOCUMENTATION
14. QA : APPROVE MODS? — NO → B / YES
14. SCCB : NEW VERSIONS TO CM
→ D

D →
15. LCSA : NEW BASELINE? — NO / YES
16. NAVSEA : APPROVE REVISIONS
17. CM : GENERATE NEW BASELINE SYSTEM
18. CM : UPDATE STATUS ACCOUNTING
19. TERMINATE

8.2   Test Bed

Funding for the AN/UYQ-25 test bed is required in the amounts reflected
in the following table.

ITEM	INITIAL EXPENDITURE	EACH YEAR FOLLOWING
1. CONFIGURATION		
- AN/UYK-20*	$60,000	-
- AN/USH-26*	28,000	-
- AN/USQ-69*	19,000	-
- TT624*	25,000	-
- U200 CRT	5,000	-
- MAG TAPE 9TR (4)#	-	-
- CABLES & ENCLOSURE*	5,500	—
- CARD READER#	-	
2. SPARES*	40,000	$15,000
3. MAINTENANCE (.5 MAN/YR-CONTRACTOR)	27,500	27,500
	$210,000	$42,500
LESS PROGRAMMED FUNDS	-177,500	
TOTAL	$ 32,500	

*These items already programmed.
#These items available from SDF after VAX installation.

TEST BED CONFIGURATION

FIGURE 8-1

-25-

8.3   Tape Generation Facility

Funding to impliment a tape generation capability is necessary in
the following amounts.

ITEM	INITIAL EXPENDITURE	EACH YEAR FOLLOWING
AN/USH-26 (4 DR)	$28,000	-
AN/USH-26 Controller	1,000	-
AN/USH-26 Driver	10,000	-
Convert Software to VAX	10,000	-
Maintenance	-	13,750
Level 2 System	10,000	-
Installation of MT's, CR	2,000	-
Spares/Cartridges	-	15,000
	61,000	28,750

TAPE GENERATION FACILITY

FIGURE 8-2

This will enable a double capability - both the Cantral Computer
Facility and the SIMAS Test Bed.

8.4   Services

The AN/UYQ-25 system will be required to support the departmental
services it uses: CCF, CM, Support Software, and Technical Support.
The estimates for these items are shown in Figure 8-4.

CCF support is estimated on the basis of a flat rate per user charge
of $10K annually. CM support is estimated at approximately one man/yr
for the first two years and .5 man/yr after that.

8.5   Total Costing Estimates

Figure 8-4 itemizes total costs, projected through FY84, of funding
the AN/UYQ-25 LCSA.

FUNCTION	NUSC/ CONTR	FY90	FY81	FY82*	FY83*	FY84*	FY85*
LCMA Mgr	NUSC	1	1	1	1	1	1
SEMA	NUSC	1	1	1	1	1	1
	CCNTR	1	2	2	2	2	2
HEMA	CCNTR	.5	.5	.5	.5	.5	.5
QA	CONTR	1	3	3	3	3	3
Fleet Liaison	CONTR	.5	1:5	2.5	2.5	2.5	2.5
TOTALS	NUSC	1	2.0	2.0	2.0	2.0	2.0
	CONTR	$\frac{4}{5}$	$\frac{7.0}{9.0}$	$\frac{8.0}{10.0}$	$\frac{8.0}{10.0}$	$\frac{8.0}{10.0}$	$\frac{8.0}{10.0}$
COST (@$55K)		$275K	$495K	$550K	$550K	$550K	$550K

*Requirements for SEMA may increase with inclusion APP enhancements.

MINIMUM CONFIGURATION

PHASING AND COST OF AN/UYQ-25 PERSONNEL

FIGURE 8-3

-27-

ITEM	FY80	FY81	FY82	FY83	FY84	FY85
PERSONNEL	$275K	$495K	$550K	$550K	$550K	$550K
TEST BED	210K	$ 42.5K	$ 42.5K	$ 42.5K	$ 42.5K	$ 42.5K
	- 177.5K[1]					
	$ 32.5K					
TAPE GENERATION FAC.	$ 61K	$ 29K	$29K	$ 29K	$ 29K	$ 29K
SERVICES						
-CCF	$ 50K[2]	$ 90K[3]	$100K[4]	$100K[4]	$100K[4]	$100K[4]
-CM	$ 50K	$ 50K	$ 25K	$ 25K	$ 25K	$ 25K
-SUPPORT SOFTWARE	$ 10K	$ 10K	$ 10K	$ 10K	$ 10K	$ 10K
-TECHNICAL SUPPORT	$ 10K	$ 10K	$ 10K	$ 10K	$ 10K	$ 10K
TOTAL	$641K	$726.5K	$766.5K	$766.5K	$766.5K	$766.5K
	- 177.5K[1]					
	$463.5K					

(1) ITEMS ALREADY PROGRAMMED
(2) 5 USERS - 1/2 YEAR
(3) 9   USERS
(4) 10   USERS

TOTAL COST PROJECTIONS
FOR AN/UYQ-25 LCSA

FIGURE 8-4